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Report to Congressional Requesters

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NONAGRICULTURAL PESTICIDES

Risks and Regulation



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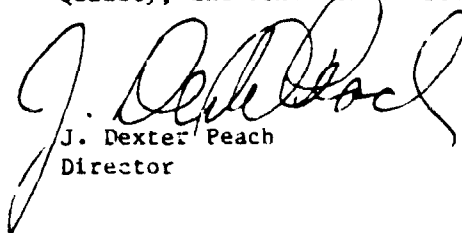
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April 18, 1986

The Honorable Dave Durenberger, Chairman
The Honorable Max Baucus, Ranking
Minority Member
Subcommittee on Toxic Substances
and Environmental Oversight
Committee on Environment and Public Works
United States Senate

As requested in your June 29, 1984, letter and subsequent discussions, we have reviewed the use of pesticides for nonagricultural purposes. The Environmental Protection Agency regulates pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act. This report addresses EPA's efforts to determine the risks associated with the use of nonagricultural pesticides, the extent to which the public is informed of such risks, and the requirements placed on professional pesticide applicators to protect the public from misuse. Another report deals with the reregistration effort and related activities (GAO/RCED-86-125). A future report will deal with the monitoring and enforcing of pesticide residues in the food supply.

As arranged with your offices, unless you publicly release its contents earlier, we will make this report available to other interested parties 14 days after the date of this letter. At that time, we will send copies to other appropriate congressional committees; the Administrator, EPA; the Director, Office of Management and Budget; the Chairman, Council on Environmental Quality; and other interested parties upon request.



J. Dexter Peach
Director

Executive Summary

Pesticides are used in homes, backyard gardens, stores, schools, restaurants, offices, industrial workplaces, sports facilities, hotels, hospitals, and theaters, and on lawns, golf courses, and highway rights-of-way to kill insects, rodents, weeds, fungi, and bacteria. While pesticides have significant benefits, they can also be harmful to human health and the environment.

At the request of the Senate Subcommittee on Toxic Substances and Environmental Oversight, Committee on Environment and Public Works, GAO addressed several questions on nonagricultural pesticides, including (1) how well-defined are their risks, and (2) to what extent is the public informed about such risks? As agreed with Subcommittee staff, GAO focused on the risks of chronic health effects.

Background

The Federal Insecticide, Fungicide, and Rodenticide Act of 1947 required that all pesticides sold in interstate commerce be federally registered and labeled in accordance with the act's requirements. The Department of Agriculture (Agriculture) administered the registration program until EPA assumed responsibility in 1970. When registering pesticides, Agriculture tried to ensure that they were effective and would not cause acute (immediate) damage such as nausea and dizziness. It was not until the 1960's that chronic health effects such as tumors, birth defects, and kidney damage became a significant concern of the federal government and the public.

In 1972 the Congress enacted major amendments, requiring EPA to reassess the risks of all registered pesticides in accordance with current scientific standards. The amendments require an assessment of chronic, as well as acute, health risks. EPA is to reregister a pesticide, thereby allowing its use to continue, only if its adverse effects are reasonable when compared to its benefits. The act allows registered pesticides to remain on the market pending EPA's reassessment, if registrants take appropriate steps to develop any new data that EPA requires. The act requires EPA to complete its reassessments as soon as possible but to give priority to pesticides used on food crops.

About 50,000 pesticide products must be reassessed. They are formulations of about 600 active ingredients (chemicals). EPA estimates that 210 chemicals have only nonagricultural uses and that many of the remaining 390 have both agricultural and nonagricultural uses. EPA requires laboratory tests of chronic health effects to be done on chemicals rather than products. This approach was authorized by the act.

Results in Brief

The chronic (long term) health risks of nonagricultural pesticides are uncertain, in part because they have not been reassessed in accordance with current standards. Reassessing pesticide risks is an enormous task that will continue into the 21st century. Food-use pesticides will be given priority as required by the Federal Insecticide, Fungicide, and Rodenticide Act, which means that, generally, pesticides with only non-agricultural uses will be the last to be reassessed. (A separate report, GAO/RCED-86-125, addresses the progress and problems of the reassessment process.)

The public is not told about the uncertainties surrounding chronic health risks. The act does not require pesticide labels to state that the pesticides have not been assessed in accordance with current standards for chronic health risks. Opinions of environmental and industry groups vary on whether they should, and EPA has not taken a position on the issue. In addition, the pesticide industry sometimes makes safety claims that EPA considers to be false or misleading. EPA has authority over claims made by pesticide manufacturers and distributors, but not by professional applicators. EPA has made limited use of its authority because it considers safety claims to be a low pesticide enforcement priority.

Principal Findings

Chronic Health Risks Uncertain

A pesticide's potential for causing chronic health effects depends on its inherent harmfulness (chronic toxicity) and the extent to which people come in contact with it (exposure). Generally, EPA does not have chronic toxicity or exposure data for nonagricultural use chemicals.

GAO reviewed the status of EPA's chronic toxicity data for 50 chemicals, which GAO selected because they are used in large quantities for nonagricultural purposes. As of September 30, 1985, EPA had done preliminary assessments for 18 of the 50 chemicals and found that it did not have enough chronic toxicity data on 17 of the 18 chemicals to complete the assessments.

EPA does not plan to require chronic toxicity testing of all nonagricultural chemicals. It believes that exposure to some nonagricultural pesticides is not significant enough to cause chronic effects in humans, regardless of the pesticides' toxicity. Based on risk assessment theory,

this is a reasonable position, if in fact exposure is insignificant. However, EPA has limited data to support this position. EPA has recently recognized the need for exposure data and has begun to gather it. (See Chapter 2.)

Public Receives Little Factual Information

Environmental group representatives believe that pesticide labels should state that chronic health risks have not been fully assessed, so the public could make better informed choices about pesticide use. Industry representatives oppose public disclosure because they question its usefulness and fear adverse effects on the industry. GAO believes that the arguments of both sides should be assessed to develop the federal government's position on this issue.

Pesticide manufacturers' advertising sometimes claims that pesticides are safe or have low toxicity. EPA believes that no pesticide can be considered "safe" and is concerned that safety claims could discourage users from following label directions. The act authorizes EPA to take enforcement action against the claims, but EPA has taken few such actions. EPA officials told GAO that it has limited resources and that safety claims are a low priority compared to other violations such as pesticide misuse.

Professional pesticide applicators such as lawn care and pest control companies also claim that the pesticides they use are safe, harmless, or EPA-approved. These claims could persuade the public to purchase a service they would not otherwise use, or discourage them from taking reasonable precautions to avoid exposure. The act, however, does not authorize EPA to act against professional applicator claims.

The Federal Trade Commission (FTC), under its own legislation, can act against distributor and applicator claims, but FTC believes that EPA is better able to handle such claims because of its expertise and specific legislative authority. (See Chapter 3.)

Matters for Congressional Consideration

Because it may be several decades before EPA assesses the chronic health risks of nonagricultural pesticides, the Congress may wish to consider whether pesticide labels should state that EPA has not fully assessed the pesticides' chronic health risks. (See page 60.)

The Congress may also wish to consider whether the public should be notified when public places are treated with pesticides, and whether the

federal government should have a role in ensuring that the public is notified. (See page 60.)

Recommendations

GAO recommends that, if EPA does not have the resources to act against unacceptable safety claims by pesticide distributors, the Administrator so inform the Congress, so it can decide whether to authorize additional resources, or grant EPA relief from this enforcement responsibility. (See page 60.)

GAO also recommends that the Administrator seek an arrangement between EPA and FTC for controlling unacceptable safety claims by professional pesticide applicators. If additional resources are needed, the Congress should be so informed. (See page 60.)

An additional recommendation directed at ensuring the competency of professional applicators is contained on page 67.

Agency Comments

GAO did not obtain official comments on this report. The views of responsible officials were obtained during our work and are incorporated into the report where appropriate.

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Abbreviations

AAPCO	Association of American Pesticide Control Officials
EPA	Environmental Protection Agency
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FTC	Federal Trade Commission
OCM	Office of Compliance Monitoring
OPP	Office of Pesticide Programs
TEAM	Total Exposure Assessment Methodology

Introduction

While pesticides have contributed significantly to increasing crop yields and decreasing disease, the Congress has long recognized that they can also be harmful to humans, animals, and vegetation. The first federal controls over pesticides were imposed in 1910. Subsequent legislation has greatly increased the level of federal pesticide control, and since 1947, the backbone of the pesticide control program has been a requirement for federal registration before a pesticide may be marketed and used.

In June 1984, the Chairman and the Ranking Minority Member of the Subcommittee on Toxic Substances and Environmental Oversight of the Senate Committee on Environment and Public Works asked us to answer several questions about the effectiveness of federal pesticide regulation in protecting the public from pesticide hazards. As a result of subsequent discussions with Subcommittee staff, it was agreed that we would undertake three reviews in response to the June 1984 request. This report summarizes the results of one review that addressed the risks associated with pesticides used for nonagricultural purposes, public information about such risks, and requirements placed on professional pesticide applicators.¹

Nonagricultural Pesticides

Nonagricultural pesticides are not used for the agricultural production or preservation of a food or feed crop, but rather are used in places where people live, work, play, or otherwise frequent as part of their daily lives. Such pesticides include insecticides, herbicides, rodenticides, fungicides, disinfectants and wood preservatives. They are used in homes, backyard gardens, stores, schools, restaurants, office buildings, industrial workplaces, sports facilities, hotels, hospitals, and theaters, on lawns and golf courses, and along highway rights-of-way. These pesticides and their uses are sometimes referred to as "urban" or "non-farm." In this report, we use the term "nonagricultural."

Pesticides have been used for nonagricultural purposes for over 75 years. Nonagricultural use intensified, however, in the late 1940's. Effective new pesticides found a ready market among people who were moving to the suburbs and encountering termites, mosquitoes, poisonous plants, and other unfamiliar pests.

¹Our other two reviews addressed the federal reregistration effort and related activities, and the monitoring and enforcing of pesticide residues.

Accurate, comprehensive statistics on nonagricultural pesticide usage are not available. However, EPA does develop national nonagricultural pesticide usage estimates each year by blending together information from a variety of outside sources. This information is all "somehow related," according to the EPA branch chief who develops the usage estimates, but is produced from different data bases and different methodologies. Through this process, EPA estimated that almost 1.5 billion pounds of pesticide active ingredients were used for nonagricultural purposes in 1984, as shown in table 1.1.²

Table 1.1: Nonagricultural Pesticide Usage in 1984

In millions of pounds	
Types of pesticides	Quantity
Herbicide	130.0
Insecticide	70.0
Fungicide	30.0
Rodenticide and others	0.2
Disinfectant	285.0
Wood preservative	950.0
Total	1,465.2

EPA estimated that, of the 230 million pounds of herbicides, insecticides, fungicides, and rodenticides used for nonagricultural purposes, 65 million pounds were applied around homes and gardens, while 165 million pounds were applied to industrial, commercial, and governmental entities. EPA did not provide a similar breakdown for wood preservatives and disinfectants.

Evolution of Federal Pesticide Regulation

In 1947, Congress enacted the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (Public Law 80-104), which repealed the 1910 Insecticide Act (Public Law 61-152) and introduced a requirement that all pesticides distributed or sold in interstate commerce be registered by the Department of Agriculture (Agriculture). Registration was intended to ensure that the registrant's claims for the product were warranted, and that the product label contained directions for use that were "adequate for the protection of the public" and warning statements which, if followed, were "adequate to prevent injury" to humans, animals, and vegetation. In accordance with the scientific knowledge of the time,

²Pesticides are generally formulations of active ingredients that destroy or control pests, and inert ingredients used to dissolve, dilute, propel, or stabilize the active ingredient in the pesticide product.

Agriculture's primary health concerns were acute effects (i.e., immediate injury or illness). The amount of data required to support a registration was determined on a case-by-case basis by Agriculture scientists.

The 1960's brought the publication of Rachel Carson's Silent Spring and major changes in concerns about pesticides. The public and regulators at Agriculture came to realize that pesticides could also cause subtle, long-term or chronic damage to human health and the environment. Thus, Agriculture began requiring registrants to provide chronic health effects data for pesticides on a case-by-case basis.

In 1970, the President transferred the authority, responsibility, and people necessary to regulate pesticides under FIFRA from Agriculture to the newly-established Environmental Protection Agency (EPA).

In 1972, the Congress enacted major FIFRA amendments (Public Law 92-516) to ensure that pesticide risks were adequately studied. The amendments required EPA to: (1) publish guidelines specifying the kind of information registrants must submit to support a registration, and (2) register a pesticide only after determining that its use would not cause "unreasonable adverse effects on the environment." The amendments also directed EPA to reassess and reregister existing pesticides in accordance with the new criteria. Reregistration was to be accomplished by October 1976. Other provisions of the 1972 amendments extended FIFRA's authority to pesticides sold in intrastate commerce, and made it illegal to use a pesticide in a manner inconsistent with the label.

The 1972 amendments placed an enormous burden on EPA by requiring all previously registered pesticides (about 50,000) to be reassessed against the new data requirements and then reregistered. In 1975, Congress extended the reregistration deadline to October 1977; in 1978, it removed the deadline, directing EPA to accomplish reregistration "in the most expeditious manner practicable." Priority was to be given to pesticides used on food crops.

Significance of Registration and Reregistration

EPA's registration authority is its primary mechanism for protecting the public against the adverse effects of pesticides.³ If EPA determines that a pesticide's use would present an unreasonable risk to human health or the environment, it can refuse to register the pesticide, which means that it cannot be legally marketed. EPA can also control a pesticide's use in various ways.

When EPA does register a pesticide, it authorizes specific uses, which are described on the EPA-approved pesticide label. For example, one pesticide is registered for use against fleas but only immature fleas; its label states that it is ineffective against adult fleas. Another is registered for use against flies and mosquitoes, but it is only for outdoor use. A third is registered for rats and mice, both inside and outside homes, industrial buildings, ships, and trains, but not in sewers. Using a pesticide for an unregistered use is an unlawful act for which EPA can take enforcement action.

EPA can also specify that precautions, such as wearing protective clothing, be taken when using a pesticide. Failure to take any precautions described on the EPA-approved pesticide label is an enforceable, unlawful act.

As part of its registration decision, EPA classifies a pesticide as being for general use or, if necessary to prevent unreasonable risks, for restricted use. Restricted-use pesticides may generally be purchased only by individuals who are certified by EPA or the states as being competent in the use and handling of pesticides (certified applicators). Restricted-use pesticides may be applied only by, or under the direct supervision of, certified applicator. EPA has generally restricted the use of pesticides that can cause severe acute effects if improperly used. However, it has begun to restrict pesticides for other reasons, including chronic health risks.

Objective, Scope, and Methodology

Our objective was to answer the following questions about nonagricultural pesticides:

- How well-defined are the risks associated with nonagricultural pesticide use?
- To what extent is the public informed about the risks of nonagricultural pesticide use?

³The discussion also applies to EPA's reregistration responsibility.

- What requirements are placed on professional pesticide applicators to protect the public against misuse of nonagricultural pesticides?

We approached each question by reviewing pertinent parts of FIFRA and EPA regulations and policies, and by discussing the issues with EPA officials. We also reviewed numerous reports and articles on nonagricultural pesticides, many of which we obtained from EPA or identified through a literature search. We also obtained information and opinions through discussions with Federal Trade Commission (FTC) officials, pesticide industry representatives, public interest group representatives, and other individuals concerned with nonagricultural pesticides. In addition to the work described above, we performed the following work to obtain information on the specific issues.

To determine the extent to which chronic health risks of nonagricultural pesticides have been defined, we focused on 50 chemicals that are used in large quantities for nonagricultural purposes. (Our selection methodology is described in appendix I.) We ascertained their reregistration status and reviewed EPA technical documents on several of the 50 chemicals to identify known or suspected chronic health effects.

To determine what the public is told about pesticides' chronic health risks, we (1) reviewed pesticide labels and pesticide advertisements in magazines, (2) visited numerous retail outlets looking for literature on pesticide health effects, and (3) wrote to companies that sell homeowner-use pesticides and to professional applicators, seeking safety information they provide to the public.⁴

The Association of American Pesticide Control Officials (AAPCO), which represents the interests and concerns of state pesticide regulators, helped us gather information on state controls over professional pesticide applicators. AAPCO requested information from each state and the District of Columbia. Forty-three states and the District of Columbia responded. We then telephoned most of the respondents to clarify and follow up on the information we had received through AAPCO. We did not evaluate the adequacy of the states' controls or the rationale for the existence or nonexistence of a state program.

Our work was conducted between October 1984 and November 1985. We discussed the matters contained in this report with EPA officials, and

⁴This report uses the term "manufacturer" to describe companies that sell homeowner pesticides, although they may buy rather than manufacture the pesticides sold under their names.

their comments have been incorporated where appropriate. In accordance with the requesters' wishes, we did not obtain official agency comments on the report. Our work was performed in accordance with generally accepted government auditing standards.

Chronic Health Risks Associated With Nonagricultural Pesticide Use Are Uncertain

There is considerable uncertainty about the potential for nonagricultural pesticides to cause chronic health effects, such as cancer, birth defects, and kidney damage. In assessing the risks associated with pesticide use, both toxicity and exposure need to be considered. Toxicity involves the pesticide's ability to cause adverse health effects. Exposure involves the manner, amount, duration, and frequency of human contact with the pesticide chemical and the manner and extent to which it is taken into the body through such contact. Data on both the chronic toxicity of pesticide chemicals and the extent of public exposure to them is limited.

The Department of Agriculture registered most pesticides currently on the market after assessing them primarily for effectiveness and acute health risks (i.e., injury or illness that occurs shortly after exposure to the pesticide). Before EPA reregisters these pesticides, as required by the 1972 FIFRA amendments, it must assess their chronic health risks. However, more than 50,000 pesticides must be assessed for reregistration, and FIFRA requires that priority be given to pesticides used on food crops. EPA is currently performing preliminary reassessments and it will not complete its assessments of nonagricultural pesticides until the 21st century.¹ In the interim, FIFRA provides that registrations for these pesticides will remain in effect, allowing their sale and use to continue.

Pesticide Risks Must Be Reassessed for Reregistration

The 1972 FIFRA amendments required EPA to (1) publish guidelines specifying the data needed to support a reregistration and (2) reassess the risks of all pesticides registered before 1972. EPA is based on data submitted in accordance with the guidelines to decide whether to reregister or cancel these pesticides. The guidelines require that reassessments address acute and chronic health effects and environmental effects. Because Agriculture concentrated on acute health effects during the 23 years when it registered pesticides, the major purposes of EPA's reassessments are chronic health and environmental effects.

EPA's Data Requirements

EPA developed its data requirements and made them known to registrants in stages beginning in 1975 and ending in October 1984 with the issuance of the final regulations. The data requirements include acute

¹A separate report, GAO/RCED-86-125, describes the reregistration process and the delays involved in reassessing pesticide chemicals; therefore, this report does not address these matters.

²EPA required pesticides registered before January 1, 1977 to be reregistered because it was at that time that the data requirements in their new guidelines were substantially available to registrants.

toxicity tests, which provide information on adverse health effects (eye irritation, vomiting, etc.) that occur soon after exposure, and chronic toxicity tests, which indicate adverse effects that may take a long time to develop (cancer, birth defects, liver damage, etc.) from prolonged and repeated pesticide exposure. Acute and chronic toxicity tests are performed on laboratory animals. The data requirements also include mutagenicity tests, which assess a pesticide's potential to affect individual cells in mammals. Unlike chronic studies, they can be done quickly and may provide some indication of a pesticide's ability to cause chronic health effects.

EPA's data requirements include four categories of chronic studies. Table 2.1, containing technical and administrative information on the chronic studies, shows that they can be expensive and time-consuming.

Table 2.1: Technical and Administrative Data on Chronic Toxicity Studies Required by EPA

Type of study	Potential effects	Animals required ^a	Estimated cost ^b	Time allowed ^c (in months)
Chronic feeding	Various chronic effects such as liver and kidney damage	Two species: one rodent, one non-rodent	\$575,000 to 700,000	50
Oncogenicity	Tumors, either benign or malignant	Two species: one rat, one mouse (study may be combined with chronic feeding study)	375,000 to 425,000 ^d	50
Reproductive effects	Changes in gonadal functions, estrus cycles, mating behavior, lactation, etc.	Two generations	90,000 to 110,000	39
Teratogenicity	Abnormalities in a fetus (birth defects) as a result of the mother's exposure during pregnancy	Pregnant animals of two species	40,000 to 48,000	15

^aSource is 49 Fed. Reg. 42892-93 (1984)

^bSource is *Regulatory Impact Analysis: Data Requirements for Registering Pesticides Under FIFRA* OPP/EPA August 1982, page 141

^cThese figures represent the time EPA allows registrants to submit requested study data (PR Notice 85-5, August 22, 1985)

^dThese figures are the EPA-reported cost of carcinogenicity studies (to identify only malignant tumors). EPA did not report oncogenicity study costs

An Overview of EPA's Reregistration Process

Approximately 50,000 registered pesticide products are subject to reregistration, but they contain only about 600 active chemical ingredients (chemicals) in various formulations. Although EPA does not know the exact number of chemicals registered for agricultural and nonagricultural purposes, it estimates that approximately 390 chemicals are registered for agricultural purposes, that many of these chemicals also have nonagricultural uses, and that approximately 210 other chemicals are registered only for nonagricultural uses.

While EPA requires some acute toxicity testing on individual products and must eventually make reregistration decisions for each product, chronic toxicity and environmental testing is being done on the chemicals, as authorized by FIFRA. The first major milestone of the reregistration process is the development of a "registration standard" for each chemical. To prepare a registration standard, EPA identifies and evaluates the data it has on each chemical and compares it to the registration data requirements it developed as a result of the 1972 FIFRA amendments. Although EPA calls this document a registration standard, it is actually a preliminary reassessment of the chemical and an identification of test and other data that must be developed for reregistration.

After pesticide manufacturers submit the EPA-required test data, EPA reviews the data and assesses the chemical's risk of causing health and environmental damage, based on toxicity test results and anticipated exposure. EPA then makes reregistration decisions for pesticide products containing the chemical.

When EPA began preparing registration standards some years ago, it found that much of the newly required chronic toxicity data (table 2.1) was missing, which made it difficult to prepare meaningful standards. Accordingly, EPA established a clerical file review effort to identify chronic toxicity studies that were completely lacking for each chemical. EPA then began notifying registrants of the data gaps through its "Data Call-In" program so that they could perform the necessary studies and develop the missing data for each chemical. The objective of the program is to have data available when the chemical is scheduled by EPA for registration standard development. Although the program applies to agricultural chemicals, many of the chemicals also have nonagricultural uses.

A separate report, GAO RCED-86-125, addresses the reregistration process in detail. The remainder of this report addresses several nonagricultural use pesticide issues, one of which is their progress through the reregistration process.

Chronic Toxicity Data Is Needed for Many Chemicals With Nonagricultural Uses

We selected a sample of 50 pesticide chemicals with nonagricultural uses to determine the completeness of EPA's chronic toxicity data. As of September 30, 1985, EPA had not yet completed its preliminary assessment for 32 of our 50 sample chemicals to determine the chronic toxicity data it needed. Additionally, 17 of the 18 chemicals for which EPA had completed its assessment were found to be lacking some chronic toxicity data, although the types and amounts varied.

In addition, EPA may not require chronic toxicity testing for many pesticides that have only nonagricultural uses. Because EPA believes that nonagricultural pesticide exposure is generally not significant due to low chemical concentrations in products, EPA does not plan to require chronic toxicity testing unless it has information indicating that there will be significant human or environmental exposure to these chemicals.

EPA Does Not Have Chronic Toxicity Data for Many Sample Chemicals

To evaluate the extent to which EPA is missing data for chemicals with nonagricultural uses we selected 50 chemicals that are used in relatively large quantities by professional applicators and/or homeowners. (Many of the chemicals selected also have agricultural uses.) Appendix I describes our selection methodology and appendix II lists the 50 sample chemicals.

The available information on chronic toxicity data gaps varies by chemical, depending on the extent to which EPA has assessed the data it has on file. The information presented in this report represents the information available as of September 30, 1985, on our 50 sample chemicals:

- For 6 chemicals, EPA had not completed its Data Call-In clerical file review to identify chronic toxicity studies not on file.
- For 26 chemicals, EPA had completed its Data Call-In review to identify missing studies. However, it had not (1) determined whether the studies on file were adequate or needed to be redone, and (2) published its determination in a preliminary registration standard. EPA found, based on its Data Call-In review, that it had complete chronic toxicity data for 11 of the 26 chemicals. The remaining 15 chemicals needed various types and amounts of data.

For 18 chemicals, EPA had completed its preliminary assessment of the studies on file and issued a preliminary registration standard which set out the number and types of studies still required. All but one of the 18 chemicals were found to be needing some chronic toxicity data as shown in table 2.2.

Table 2.2: Chronic Toxicity Data Listed as Needed in Registration Standards

Chemical	Chronic data needed*
Sulfuryl Fluoride	C,O,R
Chlorpyrifos	C,O
Atrazine	C,O,R,T
Carbaryl	C,T
Diuron	O,T
Bromacil	C,O,T
Simazine	C,O,T
Dicamba	C,O
Metolachlor	C,O,R,T
Dicofol	C,O,T
Alachlor	C,O,T
Trichlorfon	C,O,T
Phorate	C,T
Aspon	T
Lindane	C,O
Picloram	C,O,T
Chlorothalonil	O,T

C=chronic feeding; O=oncogenicity; R=reproductive effects; T=teratogenicity

*Data needs existed when the registration standard was issued and do not necessarily reflect current data needs. Also, the table does not show the quantity of data needed. For example, a "C" appears in the table if EPA's preliminary assessment reported any gaps in chronic feeding data, whether they were minor or serious.

EPA Is Just Beginning to Obtain Chronic Toxicity Data for Non-Food Use Chemicals

FIFRA, as amended, requires that in reregistering pesticides, EPA give priority to those used on food crops. Accordingly, EPA has concentrated on obtaining toxicity data for chemicals with food uses.

EPA has just begun testing a new data call-in process for chemicals with only non-food uses, in an effort to obtain significant data more quickly. Rather than reviewing its files and telling registrants what data to submit, EPA is allowing the registrants to determine the chronic toxicity data they must submit, based on EPA's published data requirements.

Using its new process, EPA had requested data on 31 non-food use chemicals as of March 30, 1985. It does not intend to request data on additional chemicals until at least April 1986 because it wants to evaluate the effectiveness of the new process before applying it to all non-food use chemicals.

EPA's data requirements state that chronic toxicity tests are required for non-food use pesticides only under certain conditions. In many cases, the condition EPA established is significant exposure potential. Table 2.3 describes the conditions under which the various types of chronic tests are required.

Table 2.3: Conditions for Requiring Chronic Testing on Chemicals Registered Only for Non-Food Uses

Chronic tests	Conditions
Chronic feeding	Repeated human exposure to the product over a significant portion of the human life span. (For example, products intended for use in and around residences, swimming pools and enclosed working spaces or their immediate vicinity.)
Oncogenicity	(1) The active ingredient, or any of its metabolites, degradation products, or impurities (a) is structurally related to a recognized carcinogen, (b) is mutagenic, or (c) produces certain subchronic effects; or (2) Human exposure over a portion of the human lifespan is significant in terms of either the time the exposure occurs or the duration of the exposure. (For example, pesticides used in treated fabrics used for apparel, diapers, or bedding; insect repellents applied directly to human skin; swimming pool additives; and constant release indoor pesticides that are used in aerosol form).
Teratogenicity	Significant exposure of human females of child bearing age.
Reproductive	Human exposure over a portion of the human lifespan, which is significant in terms of the frequency of exposure. (For example, pesticides used in treated fabrics used for apparel, diapers or bedding; insect repellents applied directly to human skin; swimming pool additives; and constant release indoor pesticides that are used in aerosol form).

According to EPA, chronic testing of nonagricultural use chemicals is being required on a conditional basis so that its resources and those of the industry can be used where they are most needed—on patterns of use that present the most hazard. EPA's data requirements state that agricultural chemicals must be tested for chronic toxicity. Nonagricultural chemicals that also have agricultural uses will therefore be tested for chronic toxicity. However, chemicals with only nonagricultural uses must generally be tested only when their exposure potential is judged to be significant. EPA believes that exposure to chemicals used as disinfectants may be significant enough to warrant chronic toxicity testing.

Under EPA's experimental data call-in program, registrants are expected to determine whether their products meet the conditions EPA has established for deciding when chronic toxicity testing is needed. Their decisions, however, are subject to EPA review.

Chronic Toxicity Testing Has Raised Concerns About Some Chemicals

Completion of chronic toxicity testing on our 50 selected chemicals may or may not indicate cause for concern. In the case of 14 of these chemicals, concerns about chronic health and environmental effects surfaced after their registration.

When EPA receives information indicating that an already-registered chemical may pose a significant risk to health or the environment, EPA subjects the chemical to its Special Review process, in which it reassesses the chemical's registrations in light of the potential risks. The process aims at determining whether the potential risks from the chemical justify taking regulatory action to further control the registered uses of the chemical. Such regulatory actions could range from label changes to cancellation of registered uses. Fourteen of our 50 sample chemicals have been subjected to the Special Review process at some point in time. Table 2.4 identifies the chemical, the suspected problems which initiated the Special Review, and the EPA actions which were taken to resolve the problem.

Chapter 2
Chronic Health Risks Associated With
Nonagricultural Pesticide Use Are Uncertain

Table 2.4: Sample Chemicals Sent Into the Special Review Process

Chemical	Chronic health concerns^a	EPA regulatory action
Alechlor	Oncogenicity	Pending
Aldrin	Carcinogenicity	Most uses cancelled
Benomyl	Reproductive effects Teratogenicity Mutagenicity	Protective clothing required for applicators
Captan	Oncogenicity Other chronic effects Mutagenicity	Pending
Carbaryl	Oncogenicity Teratogenicity Mutagenicity	Deferred (to be addressed in the reregistration process)
Chlordane	Oncogenicity	Most uses cancelled
Dichlorvos (DDVP)	Oncogenicity Reproductive effects Mutagenicity	Deferred (to be addressed in the reregistration process)
Dicofol	None ^b	Pending
Heptachlor	Oncogenicity	Most uses cancelled
Lindane	Oncogenicity Reproductive effects Teratogenicity Other chronic effects	Some limited uses cancelled
Pentachlorophenol	Oncogenicity Teratogenicity	Non-wood uses: Pending Wood uses: Safeguards required for applicators
Piperonyl Butoxide	Oncogenicity	Deferred (to be addressed in the reregistration process)
Toxaphene	Oncogenicity	Many uses cancelled
Trichlorfon	Oncogenicity Reproductive effects Teratogenicity Mutagenicity	Deferred (to be addressed in the reregistration process)

^aIn addition to chronic health concerns, several chemicals presented environmental concerns.

^bStated concerns were for environmental effects.

EPA's Knowledge About Exposure to Non-Food Use Pesticides Is Limited

EPA lacks much of the exposure data it says it needs for performing accurate and reliable risk assessments for nonagricultural use pesticides. Lack of resources and the low priority given to nonagricultural use pesticides are reasons generally cited for the current lack of exposure data. The two types of exposure data that EPA says it needs are exposure monitoring data and pesticide usage data. In registering non-food use pesticide products, EPA has generally not required exposure data, but has instead used a nonscientific estimate of potential exposure. Because of an increased awareness of the potentially significant exposure to nonagricultural pesticides, the agency has, in recent months,

begun requiring exposure monitoring data on a case-by-case basis. EPA has also taken action to obtain nonagricultural pesticide usage data.

Exposure Monitoring Data

Exposure monitoring data for nonagricultural uses addresses the extent to which a pesticide chemical is inhaled or comes in contact with the skin. For example, air monitoring studies measure the amount of a chemical released into the air, or an applicator may wear gauze pads on his or her hands as a medium for measuring the amount of a chemical that gets on the skin.

In the past, when EPA considered registering nonagricultural pesticide products, it did not require that the registrant perform a monitoring study and submit the results to EPA, nor was a formal exposure assessment conducted by EPA. Instead, EPA registration personnel reviewed the use instructions on the label and judged whether, when used as directed, the applicator risked any acute danger. The registration decision, therefore, was based entirely on the acute toxicity of the product and an EPA reviewer's judgment on the extent of exposure, based on the use method and instructions. In contrast, exposure monitoring data to determine the amount of a chemical that could be ingested has been routinely required for registration of agricultural pesticides.

The product manager in charge of registering many insecticides believes that because most nonagricultural pesticide products contain low concentration of chemicals, most are unlikely to cause chronic health effects, and that exposure monitoring tests are not warranted. However, EPA has recently begun to require the development of exposure monitoring data for nonagricultural pesticides because EPA and the scientific community have grown more aware of the potential for significant levels of exposure to these chemicals in the indoor environment. According to EPA's National Pesticides Monitoring Plan of July 1985 (required by FIFRA sec. 20(b)) it is helpful for EPA to have measurements of how much of the chemical will be inhaled or will come in contact with the skin, in order to make accurate and reliable risk assessments.

Within the last several years EPA has sought to obtain exposure monitoring data by requiring some registrants, who have requested new or amended registrations for indoor uses, to conduct field monitoring studies of potential exposure. EPA determines the need for such studies on a case-by-case basis. An EPA official has estimated that, as of October, 1985, the agency had required registrants to study exposure from about 10-15 products. Examples include pesticides added to interior paint and

rug disinfectants. Data from the paint additive study is due in December 1986. It is uncertain when data will be available from the rug disinfectant study because, as of November 1, 1985, registrants had not yet proposed how they will conduct the studies.

To develop data on the extent of exposure to pesticides in and around the home, EPA is conducting a study using the total exposure assessment methodology (TEAM) approach. EPA is conducting the study because it has little knowledge of the range of exposures (particularly through the air) of the general public, and on the relative importance of the various routes of exposure (particularly air, dermal absorption, and food). The objective of the TEAM study is to estimate the extent or range of urban residents' exposures to selected airborne pesticides. The survey portion of the study is scheduled to begin in the spring of 1986. EPA officials have indicated that preliminary data will not be available for use by EPA until the end of fiscal year 1986.

Although the pesticide TEAM study will provide much critical and basic information for understanding the extent of exposure, more will need to be done to develop the data base that EPA needs to perform reliable risk assessments. For example, the TEAM study will not address exposure from indoor use in offices, greenhouses, nurseries, etc. Also, the study will not address changes in exposure that occur as a result of seasonal changes. EPA's exposure assessment expert believes that, in addition to performing monitoring studies, EPA must educate its registration personnel on the importance of fully understanding the potential for nonagricultural pesticide exposure.

Pesticide Usage Data

Usage data are quantitative data on the kinds and amounts of pesticides used and the extent to which the public is exposed to such pesticides from multiple nonagricultural uses. According to EPA's National Pesticides Monitoring Plan, usage data can provide a vital link between its initial regulatory assumptions made during registration, as reflected in product labeling, and the consequences of use, such as chemical residues in the environment. In registering a pesticide product, EPA may assume that individuals are unlikely to use other products containing the same chemical. Its assumption may or may not be valid. If it is not valid, then individuals may be exposed to the chemical in greater quantity than EPA had anticipated. Thus, usage data is an important aid to EPA in determining the overall exposure to a pesticide chemical.

For agricultural pesticides, EPA has a process it follows for estimating the potential dietary intake of a pesticide from all registered food uses, and for ensuring that the cumulative exposure through food ingestion will not exceed a level of exposure that would pose an unreasonable health risk. The approach for controlling the dietary exposure to agricultural pesticides is called the tolerance setting process. As a result of animal testing, limits are determined as to the amount of chemical which can be ingested without causing observable adverse health effects. These limits, when adjusted for a safety factor, are extrapolated to humans. The human tolerance limit is then compared to an EPA calculation of the maximum possible amount of pesticide residue that a human could ingest by consuming food covered by proposed and existing tolerances. It covers all food crops on which the pesticide is applied.

For nonagricultural pesticide products there is no comparable tolerance setting process. When EPA considers a nonagricultural pesticide product for registration, it generally does not determine the potential for cumulative exposure—the extent to which the public may be exposed to the chemical, through the new product use and all other registered uses of the chemical.

The potential exists for cumulative and multiple nonagricultural exposure to a chemical. We interviewed pest control operators and individuals responsible for operating and maintaining various types of buildings and other facilities in the Boston, Massachusetts area to find out which pesticides they use for which types of pests. The purpose of the survey was to identify various places where individuals may come in contact with pesticides. The data is not necessarily representative of other parts of the country. However, we believe that it is fairly typical, because frequently mentioned pests were cockroaches and rodents, which are common in other parts of the country, and because many of the pesticides used were also identified in an EPA-sponsored study as being used in large quantities on a national basis.³

The information we obtained (summarized in appendices III, IV, and V) illustrates how an individual might be exposed to the same pesticide chemical from a number of sources. For example, chlorpyrifos was used to combat cockroaches and other insects in 12 types of facilities, including office buildings, subway stations, retail stores, restaurants, and hospitals. Another insecticide, diazinon, was used in four types of

³National Urban Pesticide Applicator Survey: Final Report, Economic Analysis Branch, Office of Pesticide Programs, EPA, April 13, 1984.

facilities, including public housing complexes, office buildings, and a sports arena.

Our survey covered only a small number of locations and completely excluded pesticides that individuals apply or hire professionals to apply around their own homes. Many of the chemicals used in locations we surveyed are formulated for household use. For example, chlorpyrifos, pireronyl butoxide, carbaryl, and glyphosate are contained in pesticides sold in such common outlets as supermarkets, hardware stores, department stores, and garden supply centers. Also, 2,4-D; dicamba; chlorpyrifos; and diazinon are used by professional lawn care companies. Accordingly, our survey results provide only a small indication of the potential for cumulative, nonagricultural exposure.

Moreover, many chemicals used in the locations we surveyed are also used in agriculture, which means that additional exposure could result from residues on food. Diazinon, methoxychlor, chlorpyrifos, and 2,4-D are a few examples of such chemicals.

The Chief of the Economic Analysis Branch of EPA's Office of Pesticide Programs (OPP) said he believed that ideally a national survey should be conducted to determine the extent to which homeowners use particular pesticides and the ways in which they use the pesticides. Although a pilot study has been performed, he doubts that a national survey will be conducted because it would cost about \$2-3 million. He said an option for completing a national survey would be to do it in a staggered fashion on a regional basis. The major reason cited for not carrying out such homeowner surveys was a limited availability of funds. As of January 1986, however, EPA had earmarked about \$250,000 for a limited household usage survey, which is scheduled to begin in late summer of 1986.

EPA has undertaken several surveys to obtain pesticide usage data in locations other than the home. These surveys, and their status as of January 1986 are as follows:

- 1) National Urban Professional Applicator Survey (report issued).
- 2) Golf courses (report complete but not issued).

- 3) Nurseries (report complete but not issued).
- 4) Food establishments (ongoing).
- 5) Hospitals (ongoing).

Conclusions

People are exposed to the chemicals in nonagricultural pesticide products in many different ways. However, neither the nature, frequency, amount, or extent of these exposures, nor the potential chronic toxicity of these chemicals is well known. EPA recognizes this situation, and has begun the process of obtaining toxicity and exposure data, so that it can reassess the risks of pesticides registered before 1977. However, because of the enormous task involved in reregistering 50,000 pesticides, the limited available resources, and the fact that EPA is giving priority to food-use pesticides as FIFRA requires, it may take EPA until the 21st century to complete its assessments of nonagricultural pesticides. In the interim, the general public will continue to be exposed to these chemicals while EPA assesses the risks associated with existing pesticide registrations and identifies any changes in the registrations that are necessary to prevent unreasonable health risks. The information the public receives relating to this and other issues is discussed in the following chapter.

The General Public Receives Limited and Misleading Information on Pesticide Hazards

People who buy and apply pesticides around their homes or who hire professional applicators to apply pesticides for them, are not told that the pesticides have not been tested for chronic health effects, in accordance with current standards. Moreover, the pesticide industry sometimes makes safety claims that EPA considers to be false or misleading.

FIFRA, as amended, gives EPA the authority to take enforcement action against false and misleading claims made by pesticide distributors. However, our review indicated that enforcement action has been limited because EPA considers advertising claims to be a low enforcement priority. FIFRA, as amended, does not authorize EPA to control safety claims made by professional applicators (pest control and lawn care companies), even though they sometimes make claims that would be subject to enforcement action, if made by a pesticide distributor. The Federal Trade Commission (FTC), under its own legislative authority, can control pesticide safety claims by distributors and professional applicators. However, FTC seldom uses its authority because it believes that EPA is better able to deal with pesticide safety claims.

Not only is the public poorly informed about the risks associated with nonagricultural pesticide use, individuals may not even be aware that pesticides are used in places they routinely visit. To reduce involuntary pesticide exposure, several local governments have adopted or considered ordinances to require public notification for various kinds of pesticide applications. However, the pesticide industry opposes local government regulation of pesticides, and in several cases, the courts have decided that the local governments concerned did not have authority to regulate pesticides.

Hazard Information on Pesticide Labels Is Limited

FIFRA requires that pesticide labels contain warning statements which, if followed, will protect human health and the environment against unreasonable risk. EPA requires labels to warn users about potential acute health effects. It has also required a few pesticide labels to advise users of oncogenic and teratogenic effects occurring in laboratory tests. EPA does not require labels to inform users that the risk of chronic health effects has not been assessed in accordance with current standards. Opinions vary on whether labels should disclose this information.

**Existing Labeling
 Regulations Address Acute
 Toxicity**

EPA regulations prescribe a detailed system for determining the warning statements that must appear on a pesticide label to prevent accident, injury, or damage. Each pesticide is placed into one of four toxicity categories, based on a series of tests. The toxicity category determines the "signal word" and type of precautionary statements that must appear on a pesticide label. To illustrate, table 3.1 shows the different signal words and precautionary statements that would be required, depending on the results of inhalation testing (which is one indicator of toxicity).

**Table 3.1: Signal Words and
 Precautionary Statements Required on
 Pesticide Labels**

Toxicity category	Signal word (required on front panel)	Precautionary statement
I	"Danger," "Poison," skull and crossbones	"Fatal (poisonous) if inhaled" "Do not breathe vapors"
II	"Warning"	"May be fatal if inhaled" "Do not breathe vapors"
III	"Caution"	"Harmful if inhaled" "Avoid breathing vapors"
IV	"Caution"	None required

The tests EPA uses to assess and categorize a pesticide deal only with acute effects, e.g., eye or skin irritation, and other harmful effects (including death), that occur shortly after the pesticide is swallowed, inhaled, or applied to the skin or eyes. Similarly, the required precautionary statements are determined by and intended to prevent acute effects.

**Few Pesticide Labels
 Describe Potential Chronic
 Health Effects**

Although its labeling regulations do not require that chronic health hazards be described, EPA has required a few nonagricultural pesticide products to contain label statements about potential chronic effects. According to the Acting Chief of OPP's Fungicide and Herbicide Branch, pesticides containing amitrole, which is used to kill poison ivy, must state that it has caused tumors in laboratory animals. Amitrole is contained in about 20 pesticides, of which 17 are for professional use and 3 are for homeowner use.

In March 1985, OPP adopted a formal policy for identifying pesticides that must carry tumor warnings. The policy lists several factors to be considered in EPA's determination, including (1) weight of the evidence that the chemical is oncogenic; (2) significance of the actual risk, considering both toxicity and exposure; and (3) size of the exposed population. When a warning is warranted, EPA's policy requires the following language on pesticide labels:

"The use of this product may be hazardous to your health. This product contains (chemical name), which has been determined to cause tumors in laboratory animals. Risks can be reduced by closely following the use directions and precautions, and by wearing protective clothing specified elsewhere on this label."

Besides encouraging proper use, OPP's tumor warnings are intended to provide users the opportunity to give informed consent to accepting the oncogenic risks.

OPP officials said they believed a formal tumor warning policy was needed because manufacturers are increasingly seeking registration for herbicides that have caused oncogenic effects in laboratory tests, but do not present an unreasonable risk in view of their significant benefits. In OPP's judgment, a need for a similar warning does not occur frequently enough with regard to reproductive, teratogenic, and other types of chronic effects to warrant formal policies for them.

Oncogenicity data gaps for older pesticides (see ch. 2) make it difficult for OPP to apply its policy effectively. The Chief of OPP's Program Coordination Staff stated that the data for some chemicals suggest oncogenic effects, but the data may have resulted from questionable tests, or other tests may have shown no oncogenic effects. In such cases, EPA may request registrants to perform additional tests that would allow EPA to assess fully the chemicals' oncogenic risk.

**Labels Do Not Explain
Incomplete Chronic Health
Risk Assessments**

While pesticide chemicals registered since 1977 had to undergo a stringent risk assessment based on EPA's current standards, older pesticides were often registered without an assessment of their chronic health risks. Labels do not explain that the extent of EPA's risk assessment varies among pesticides and do not inform users that a pesticide's chronic health risks have not been fully assessed in accordance with current standards. According to the Chief of OPP's Program Coordination Staff, OPP has not considered requiring such label explanations.

Opinions vary on whether labels should explain that pesticides have not been fully tested for chronic health effects. Environmental groups (the Natural Resources Defense Council and the National Coalition Against the Misuse of Pesticides) believe that labels should contain this information. A Council pesticide specialist stated that providing information on chronic effect uncertainties would improve the public's ability to weigh pesticide risks and benefits by making them more aware of risks. She said that their ability is currently limited because pesticide benefits are

apparent, but chronic health risks are not. Similarly, the Coalition's national coordinator believes that pesticide users should be told about the uncertainties surrounding chronic health effects because, regardless of how they respond to it, they would be able to make more intelligent choices.

The Chemical Specialties Manufacturers Association represents formulators of nonagricultural pesticide products and other chemical products such as detergents, anti-freeze, and floor wax. Association representatives oppose label statements which state that pesticides have not been fully tested or evaluated for chronic health effects. They are concerned that some pesticides would unfairly have to carry the label statement longer than others because laboratory capacity and research personnel are limited and because EPA resources to evaluate test results are limited. They also fear that if labels say that pesticides are not fully tested and evaluated for chronic effects, the Association's members will be vulnerable to lawsuits and unable to obtain liability insurance. Association representatives also questioned the usefulness of disclosing incomplete chronic effect assessments. According to the Association, label statements saying only that a pesticide has not been fully evaluated would not enable users to distinguish between pesticides that need much additional testing and those that appear to have no chronic toxicity problems based on relatively complete testing. Also, Association constituents believe their products carry no real risk of chronic effects because the products contain low concentrations of active chemical ingredients.

Health Effects Information Provided by the Pesticide Industry

We reviewed various types of pesticide industry literature to determine chronic effects information that the industry makes available to the public. None of the industry literature specifically discussed chronic health effects.

Pesticide manufacturer literature sometimes contained claims of safety or low toxicity—claims that EPA considers unlawful under FIFRA, as amended. FIFRA authorizes several types of enforcement actions including civil and criminal penalties, but enforcement action for unacceptable safety claims is a low EPA priority.

Professional pesticide applicators sometimes made safety claims that were similar to the manufacturers' unlawful claims. However, according to EPA officials, FIFRA, as amended, does not authorize EPA to control professional applicator safety claims. In addition, professional applicators

frequently referred to the fact of EPA pesticide registration as an indication of safety. None explained that, although registered, the pesticides' risks have not been reassessed in accordance with current standards.

Pesticide Manufacturer Safety Claims

To determine the health effects information that manufacturers and distributors provide to pesticide users, we looked for literature at pesticide displays in hardware stores, grocery stores, discount department stores, and retail nurseries in Massachusetts. We also reviewed the following magazines—generally two or three issues of each—looking for pesticide advertisements discussing health effects:

ALA (serving the American lawn applicator and maintenance professional)

American Fruit Grower

Better Homes and Gardens

Dogfancy

Garden Supply Retailer

Grounds Maintenance

Horticulture

House and Garden

Landscape Architecture

Lawn and Garden Marketing

Life

Nursery Business-Retailer

Park Maintenance and Grounds Management

Pest Control

Popular Mechanics

Reader's Digest

Restaurants & Institutions

Saturday Evening Post

The Family Handyman

Weeds Trees & Turf

We also wrote to six pesticide manufacturers/distributors asking them "how safe" specific home-use products were. We identified ourselves as private citizens rather than GAO representatives to ensure that we obtained the same information normally provided to individuals who express concern about pesticide safety.

None of the literature, advertisements, or written responses we obtained specifically mentioned the potential for oncogenic, reproductive, teratogenic, or other chronic health effects. Our visits to pesticide retail outlets produced only one brochure that even indirectly discussed pesticide health effects. Several magazines that are clearly directed at the general public, such as Life, House and Garden, and Saturday Evening Post, contained no pesticide advertisements. Other magazines directed at the public did contain pesticide advertisements, but we found only one advertisement that discussed health and safety; its discussion was very general. Several magazines, which are available to the public, but are aimed at lawn care professionals, pest control operators, nursery owners, golf course and park maintenance individuals, etc., contained advertisements with reference to health and safety but not specifically to chronic health risks. Three pesticide manufacturers/distributors responded to our information requests. All three said their products are safe when used as directed. In general, manufacturers/distributors' discussions of health and safety were limited to assurances that products are safe or have low toxicity, as shown in table 3.2.

Chapter 3
The General Public Receives Limited and
Misleading Information on Pesticide Hazards

Table 3.2: Examples of Health and Safety Information Provided by Pesticide Manufacturers

Product	Active ingredient	Source of information	Manufacturer claims
A	Carbaryl(I)	Brochure at retail display	"When compared with other insecticides, [this product] ranks low in toxicity to people, animals, birds, and fish."
B	Pendimethalin(H)	<u>Grounds Maintenance</u>	"[This product] is economical, safe, and as effective as any treatment you can buy."
C	Glyphosate(H)	<u>Park Maintenance and Grounds Management</u>	"Because [this product] has exceptional environmental characteristics and is odor free, you won't have to worry about using it in areas used by people, pets and wildlife."
D	Dichlobenil(H)	<u>Nursery Business-Retailer</u>	"sure-simple-safe"
E	Chlorpyrifos(I)	<u>Weeds Trees & Turf</u>	"You'll appreciate the low toxicity of [this product] to both humans and pets."
F	Acephate(I)	<u>Pest Control</u>	"Low toxicity to people..."
G	Carbaryl(I)	<u>Better Homes and Gardens</u>	"...biodegradable in the environment...you can feel comfortable using [it] just about anywhere around your yard. [it] has no harsh smell."
H	Dicamba(H)	Manufacturer response to consumer request	"...it is safe to use our products provided you use them exactly as stated on the label and do not deviate from the directions nor use the product in any way or for any purpose that is not specifically mentioned on the label."
I	Methoxychlor(I)		
J	Piperonyl butoxide(I)	Manufacturer response to consumer request	"Let me assure you that [our products] have been thoroughly tested and are safe when used according to label directions."
K	Chlorpyrifos(I)		
L	Dicofol(I)	Manufacturer response to consumer request	"All [our] Consumer Products have been extensively researched and tested and are safe for homeowner use as long as the label directions are followed."
M	Malathion(I)		
N	Carbaryl(I) Glyphosate(H)		

I-insecticide; H-herbicide

Problems With Manufacturer Claims

The advertising claims shown in table 3.2 are unlawful, according to OPP Registration Division officials who reviewed them. Section 12(a)(1)(B) of FIFRA, as amended, prohibits claims made as part of a pesticide's distribution and sale that differ substantially from claims made as part of a registration application. EPA's official interpretation of section

12(a)(1)(B) has been limited. A 1981 policy notice says that advertising claims are covered by section 12(a)(1)(B), but it does not provide criteria for EPA to determine whether the claims are acceptable under section 12(a)(1)(B). OPP's Registration Division, however, has an unwritten policy stating that any claim that is unacceptable for a pesticide label is also unacceptable in advertising.

Section 12(a)(1)(E) of FIFRA, as amended, makes it unlawful for pesticide labels to bear any statement, design, or graphic representation that is false or misleading. EPA's implementing regulations prohibit the following kinds of health and safety claims on the basis that they are false and misleading:

- any statement directly or indirectly implying that the pesticide is recommended or endorsed by any federal agency;
- a true statement used in such a way as to give a false or misleading impression to the purchaser;
- claims as to the safety of the pesticide or its ingredients including statements such as "safe," "nonpoisonous," "noninjurious," "harmless," or "nontoxic to humans and pets" with or without a qualifying phrase such as "when used as directed"; and
- non-numerical or comparative statements on the safety of the product, including but not limited to: "Contains all natural ingredients," "Among the least toxic chemicals known," and "Pollution approved."

EPA also considers the following phrases to be false and misleading under its existing criteria and has proposed a rule to prohibit them explicitly:

- "approved by" any agency of the federal government; and
- "low in toxicity," "will not harm beneficial insects," "no health hazard," and "ecologically compatible."

EPA's labeling prohibitions are based on its repeatedly stated position that no pesticide is "safe" because pesticides are, by their very nature, designed to be biologically active and kill various kinds of organisms. Further, an OPP Registration Division official said that labeling statements that convey the impression of safety could lead users to believe that use directions and caution statements are not important.

Advertising Safety Claims Are Low Priority

FIFRA enforcement is a joint effort by EPA and the states. EPA's Office of Compliance Monitoring (OCM) prepares national guidance, which describes EPA's overall enforcement strategy and is intended to achieve national consistency. An OCM official said that OCM can take enforcement action, but does so only when a case has national significance, and few cases do. EPA's regional offices can take enforcement action without obtaining OCM's concurrence, but they are expected to follow the national guidance. The regional offices also oversee state enforcement activities. Almost all states have annual cooperative agreements with EPA through which they receive federal grants to participate in FIFRA enforcement.

FIFRA provides several enforcement alternatives for unlawful advertising claims, including civil penalties of not more than \$5,000 and criminal penalties of not more than \$25,000 and 1 year in prison. In addition, a pesticide may be seized for confiscation. According to EPA's guidance manual for FIFRA compliance and enforcement, the first action to be taken against an improper advertising claim is an advertising letter. In an advertising letter, EPA notifies a company that its literature contains unacceptable statements and asks the company to respond in writing, explaining the action it plans to take. Depending on the circumstances and the company's response, EPA may then take more formal action.

We attempted to determine the frequency of EPA and state action against unacceptable advertising safety claims such as those shown in table 3.2. However, we obtained no data on state enforcement actions or advertising letters issued by EPA regional offices. OCM had no data on these actions, and obtaining the data from individual states and regional offices would have been too time-consuming.

The information OCM did provide shows that EPA has taken few formal enforcement actions against advertising safety claims. Between January 1, 1984, and July 30, 1985, EPA took 18 enforcement actions, other than advertising letters, under FIFRA section 12 (a)(1)(B). EPA's Region V (Chicago) took 13 of the actions. An environmental protection specialist in Region V told us that only one of the 13 actions involved a safety claim in pesticide literature. One other action addressed a safety claim in pesticide labeling, and most of the others involved efficacy (effectiveness) claims.

The Director of OCM's Compliance Division stated that it has limited resources, that pesticide misuse is OCM's primary concern, that advertising claims are a low priority, and that no active program exists to

screen pesticide literature. We reviewed OCM's 1985 grant guidance that set the national priorities for the states to consider when setting their FIFRA enforcement priorities. Reviewing pesticide advertising was not listed as a national priority.

Professional Applicator Safety Claims

To find out what health and safety information professional applicators provide to potential customers, we wrote to 18 lawn care companies and pest control firms, asking for information on the pesticide chemicals they use and the "safety" of their chemicals. We identified ourselves as private citizens seeking professional services, rather than as GAO representatives, to ensure that we obtained the same information normally provided to individuals who express concern about pesticide safety.

Five of the 18 professional applicators responded to our requests (three lawn care companies and two pest control firms).¹ In addition, we examined safety information contained in literature from four lawn care companies, which was sent to staff members' homes to solicit business during our review. In seven of the nine cases, the professional applicators' health and safety discussions were contained in general purpose brochures; in the remaining two cases, they were contained in written responses.

None of the professional applicators specifically discussed chronic health risks. Eight of the nine firms that sent us information on health and safety stated that their chemicals are registered or approved by EPA, as part of their health and safety discussions. Table 3.3 illustrates the ways in which professional applicators addressed health and safety concerns.

¹Two additional professional applicators responded to our mailing, but did not address health and safety. The post office returned three other requests as undeliverable.

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Table 3.3: Examples of Health and Safety Information Provided by Professional Pesticide Applicators

Active ingredient	Professional applicator claims
Acephate, betasan, carbaryl, chlorpyrifos, dacthal, diazinon, glyphosate, malathion, methoxychlor, and others	<p>Question (posed by the applicator): "Can these materials [you use] harm my children or pets?"</p> <p>Answer: "Absolutely not!" [We use] only the safest materials, all registered with the Environmental Protection Agency for use on turf. There is no possible danger to people or pets. When possible, stay off your lawn for about an hour after each treatment to allow the materials to dry."</p>
2,4-D, betasan, chlorpyrifos, diazinon, dicamba, and others	<p>"Each of the materials [we use] is approved and registered for use on lawns by the Federal Environmental Protection Agency...Every chemical...was rigorously tested for safety to applicators, customers, domestic animals, wildlife, and the environment. The E.P.A. requires a review and registration every five years."</p>
None mentioned by name	<p>Question (posed by the applicator): "Are these materials safe for use around my home?"</p> <p>Answer: "[Our] materials are EPA approved, and selected by a professional agronomist. Materials are chosen both for their effectiveness and environmental safety."</p>
None mentioned by name	<p>"[Our] EPA registered chemicals are safe...All [our] chemicals are registered with the Environmental Protection Agency, and are properly applied to keep your family safe from harm."</p>
Glyphosate, oryzalin	<p>"All pesticides used are registered with the federal and state environmental protection agencies..."</p> <p>"Many common household products are rated at a higher level of toxicity than [one of our typical applications], including aspirin, ink, shaving cream, furniture cleaners, deodorants, suntan lotion, modeling clay, cooking oil, Easter egg dye and many more."</p> <p>"A person would have to ingest over 40 cupfuls of lawn clippings treated by [the professional applicator] to equal the toxicity of a single cup of coffee."</p>
None mentioned by name	<p>"When the service is performed, you will be required to vacate for...three (3) hours for a drying period. Once the chemical has dried...it is not harmful..."</p>

The professional applicators' claims shown in table 3.3 all use language that is not allowed on pesticide labels, according to OPP Registration Division officials who reviewed the applicators' literature. For example, EPA regulations do not allow labels to say that pesticides "absolutely cannot harm children or pets," present "no possible danger," "are safe," are "EPA-approved," or are "harmless."

However, EPA officials told us that FIFRA, as amended, provides no control over professional applicator safety claims. According to an official in OPP's Registration Division, Section 12(a)(1)(B) applies only to people who distribute and sell pesticides, not to people who use them, such as professional applicators.

Several professional applicators, in discussing the safety of their pesticides, stated that they are "EPA-registered." EPA differentiates between the terms "EPA-registered" and "EPA-approved." According to OPP Registration Division officials, it is unlawful for pesticide labels and distributors' promotional material to state that pesticides are EPA-approved, because the statement implies that EPA recommends or endorses the product. However, as authorized by FIFRA, EPA requires labels to contain an EPA registration number, and EPA allows distributors' promotional material to state that a pesticide is EPA-registered.

We question whether the general public understands the difference between EPA registration and EPA approval. Moreover, we question whether it is appropriate for professional applicators to use EPA registration as an indication of pesticide safety when, as explained in chapter 2, many pesticides were registered based on risk assessments that are inadequate by current standards.

Pesticide Safety Claims and the Federal Trade Commission

The Federal Trade Commission Act, as amended, authorizes the Federal Trade Commission (FTC) to protect consumers against false and deceptive advertising claims. According to FTC, this directive includes safety claims by pesticide distributors and professional applicators.

FTC is authorized to take several types of actions against persons who make deceptive pesticide safety claims. It can (1) issue cease and desist orders; (2) seek, in the federal courts, civil penalties of up to \$10,000 for each violation; and (3) seek, in the federal courts, temporary restraining orders, injunctions, or redress for consumers.

FTC rarely initiates action against pesticide advertising. FTC does not have summary data showing the pesticide-related actions it has taken, but its Program Advisor for General Advertising (which includes pesticide advertising) could recall only about three pesticide actions within the last 10 or so years. He stated that FTC is a small agency with limited resources. FTC's Associate Director, Division of Advertising Practices, stated that FTC is concerned about deceptive pesticide safety claims, but believes that EPA can better deal with them because of its specific statutory authority and technical expertise.

Besides taking action under FIFRA, as amended, EPA can refer improper manufacturer claims to the FTC. EPA/OCM could not tell us how many cases EPA has referred to FTC for enforcement action. The Director of OCM's Compliance Division explained that EPA's regional offices are

encouraged to go to local FTC offices when they believe FTC involvement is appropriate. He has no information on regional referrals. In addition, the Compliance Division does not keep records of its referrals to FTC headquarters. The director could not recall any headquarters referrals during the past year, with the possible exception of a case involving efficacy claims. He said that EPA stopped referring cases to FTC because it sensed that FTC was either unable or unwilling to handle them. According to a branch chief in OPP's Registration Division, EPA referred agricultural pesticide advertising problems to FTC until the late 1970's, when FTC stopped responding to its referrals.

Public Perceptions of Pesticide Risks Vary

We attempted to determine how the general public perceives pesticide chronic health risks in view of the limited and potentially misleading information they receive from labels and industry sources. The information we obtained indicates that public perceptions vary greatly and are based on limited pesticide knowledge.

We identified only two formal studies that addressed public perceptions of pesticide risks. The first study was performed during the winter of 1977-78 and the results were published in 1983.² Researchers interviewed 601 individuals in Berkeley, California; New Brunswick, New Jersey; and Dallas, Texas. Almost half of the respondents reported that their attitude toward chemical pesticides had changed over the years. Eleven respondents (about 2 percent) indicated their attitude toward pesticides had become more positive, 31 respondents (about 5 percent) said they had stopped using pesticides, and 189 respondents (about 31 percent) said they had become "more cautious" about pesticide use. The study did not state how the attitudes of about 9 percent of the respondents changed.

The second study was performed in January 1982, by the Opinion Research Corporation for the National Pest Control Association, which represents structural (building) pest control operators. Researchers surveyed 1,005 scientifically selected members of the public. Although the study's primary focus was not on perceptions of pesticide risks, researchers solicited opinions on three statements that addressed risks. Table 3.4 summarizes the responses they received.

²Hanna L. Jensen and Gordon W. Frankoe, "A Study of Homeowner Attitudes and Practices Toward Arthropod Pests and Pesticides in three U.S. Metropolitan Areas," Urban Entomology: Inter-disciplinary Perspectives. (Praeger Publishers, 1983).

Table 3.4: Summary of Opinions on Risk-Related Statements in Opinion Research Corporation Study

Percentage of respondents			
Statement	Agree	Disagree	No opinion reported
Chemical pesticides can be safely used to rid the home of unwanted pests	75	13	12
Compared to other industries, there are relatively few environmental problems related to pest control activities	41	27	32
Most pesticides are too hazardous for use by the average homeowner	44	45	11

In addition to the data provided by formal studies, several individuals in positions to learn about public perceptions provided their observations:

- The Chief of EPA Region I's Office of Pesticides and Toxic Substances, and the Pesticide Coordinator of the Massachusetts Cooperative Extension Service both said they receive telephone calls from people seeking information on pesticide chronic health effects. The EPA official explained that whenever the newspapers run a pesticide story, his office receives numerous calls from people who are afraid of being hurt by the pesticide discussed. He believes that the news media often exaggerate risks, causing people to become unnecessarily upset.
- An official of the Massachusetts Pesticide Bureau said that in September 1984, the Bureau conducted an informal public opinion survey that showed polarized opinions on the wisdom of using pesticides. Some respondents were strongly in favor of using pesticides, while others were strongly opposed to their use.
- A Cooperative Extension Service agent stated that some people are afraid of pesticides because they believe that pesticide manufacturers can sell any product they wish without any governmental control. In contrast, a retail nursery clerk stated that many people do not understand that pesticides can be hazardous because they believe that if a pesticide is sold in retail stores, it is safe.

At an October 1984 conference sponsored by the National Agricultural Chemicals Association, Dr. C.F. Wilkinson, the Director of Cornell University's Institute for Comparative and Environmental Toxicology discussed the risks presented by modern technologies such as pesticides, and public concern about these risks. Dr. Wilkinson made the following observations:

- The public wants reliable risk information. "...For almost two decades, an increasingly fearful, confused, and indignant public have been

insisting on [good risk information]... Perhaps the question asked most frequently... is 'is it safe?'"

- Scientific risk assessment capabilities are limited. "...In most cases science cannot provide unequivocal answers to the questions that are being posed... and worse, it is unlikely that we will ever have completely satisfactory answers... [the public and the media] don't realize that 'safety' is a meaningless term with respect to technological risk because it means the total absence of risk, a state that can never be attained."
- Scientists must educate the media and the public. "We have a serious communication gap between what the public and the media believe science can do... and what is within the real capabilities of science to deliver... Scientists and policy-makers in the regulatory agencies must... try harder to communicate with the media and the public and must clearly explain the science, especially the scientific uncertainty on which many of their decisions are based."

Public Notification of Pesticide Use

The lack of information about nonagricultural pesticides goes beyond potential chronic effects. When pesticides are applied in places such as schools, restaurants, hotels, offices, industrial workplaces, parks, and golf courses, the public may not be aware of their use, and may be exposed to pesticides without their knowledge and against their will. This situation presents special problems for people who suffer adverse effects from exposure levels that cause no apparent problems for most people.

In the past several years, numerous local governments have adopted or considered adopting requirements for public notification when pesticides are applied. The pesticide industry, however, opposes local government efforts to regulate pesticides and in several cases, courts have ruled that the local governments concerned did not have the authority to regulate pesticides.

Pesticide Sensitivity

Neither EPA nor the American Medical Association has quantitative data to show the number of people who are sensitive to pesticides or the severity of their reactions. Some medical researchers believe that sensitivity causes a wide range of physical and behavioral symptoms in people who do not realize that pesticides and other substances such as gas fumes, sponge rubber, and cleaning materials are the source of their illness. These researchers believe that low pesticide exposures can cause fatigue, headaches, muscular aches, eye irritation, coughing, dizziness,

motor instability, forgetfulness, depression, hyperactivity, and irritability in pesticide-sensitive people.

EPA/OPP officials called pesticide sensitivity a "messy area" which nobody seems to understand well and a difficult question on which the medical community disagrees. These officials, however, recognize that some people are abnormally sensitive to some pesticides and suffer allergic-type reactions from exposure. In a 1982 publication titled Recognition and Management of Pesticide Poisonings, EPA stated, "Many agents have irritant properties, and individuals vary widely in their reactions to them. Certain predisposed persons may suffer dermal and respiratory illnesses from substances that have no effect on other persons or experimental animals."

Local Government Pesticide Regulation

Within the past few years, many local governments have considered or adopted various types of requirements to notify the public about pesticide use in public areas. Specific requirements vary. For example, an ordinance may require notification only for aerial or outdoor applications; it may exempt homeowners who apply pesticides on their own property; it may require notification before or after application; and it may specify different means of notification, such as signs or mailings.

One of the most publicized public notification ordinances was adopted by Wauconda, Illinois, in July 1984. The ordinance required signs to be posted for 72 hours after pesticides were applied outdoors and in buildings where "the public is commonly invited for the sale of goods or services." The Pesticide Public Policy Foundation, a group representing the lawn care and other "green industries" challenged Wauconda's ordinance. In August 1985, a U.S. district court in Illinois decided that Illinois law preempts Wauconda from regulating pesticides and declared the ordinance invalid. Wauconda appealed this decision and the case was pending as of March 30, 1986.

In explaining its decision, the district court found it significant that three other courts, in considering the issue, had decided that local government regulation of pesticide use was preempted by state statute. It specifically referred to decisions of a New York appellate court, the Massachusetts Supreme Court, and the New Hampshire Supreme Court. These three courts and the U.S. District Court in Illinois generally cited two reasons for their findings of preemption: (1) The state's pesticide legislation provided a comprehensive regulatory scheme and (2) it was intended to achieve statewide uniformity.

In May 1985, the Professional Lawn Care Association of America testified on local government pesticide regulation before the Subcommittee on Department Operations, Research and Foreign Agriculture, House Committee on Agriculture. The Association expressed fear that local regulations, including public notification requirements, will proliferate and that complying with many different regulations will be complex and costly. It also argued that local governments do not have the scientific expertise to regulate pesticides or the resources to enforce their regulations. The Association urged (1) a strong and visible federal presence in the pesticide regulatory arena, (2) reasoned regulation and enforcement by EPA and the states, and (3) a FIFRA amendment explicitly preventing local governments from regulating pesticides.

The Pesticide Public Policy Foundation and Chemlawn Services Corporation (the nation's largest lawn care company) share the Association's opposition to local government pesticide regulation. However, representatives from both groups said they might be receptive to a national requirement for public notification of pesticide use, depending on its specific provisions. Chemlawn's Manager of Regulatory and Legislative Affairs expressed two concerns about such a requirement: It should not be so cumbersome that it discourages customers from taking Chemlawn's service, and it should not lead people to believe that lawn applications are highly dangerous. The Foundation's program director fears that notification could make Foundation constituents more vulnerable to lawsuits by people who pass by a treated lawn, see the notification sign, and sue, claiming that they experienced nausea, dizziness, etc., from pesticide exposure. He also believes that notification costs could exceed its benefits. Although the Foundation recognizes that some people are abnormally sensitive to pesticides, it is not convinced that the sensitivity problem warrants public notification.

The National Pest Control Association represents structural pest control operators, i.e., those who apply pesticides in and around buildings to protect health and property. The Association generally opposes public notification when pesticides are applied in public buildings, because it believes that notification would arouse unnecessary fears. Its Director of Government Affairs stated that workers who believe they are pesticide-sensitive should be able to register with their employers and be told when pesticides are applied in the workplace. The Association sees no need to warn pesticide-sensitive people about applications in restaurants, theaters, and other public buildings because, according to the Director of Government Affairs, these buildings should be closed to the public when pesticides are applied.

The Chief of OPP's Policy and Special Projects Office acknowledged that registration and labeling requirements do not adequately protect people in cases of abnormal pesticide sensitivity and that they should be given the chance to avoid exposure. However, she stated that EPA is concerned about the practical problems associated with public notification. EPA believes that if society decides that people should be warned when pesticides are or will be used, notification requirements should not single out a particular type of potential exposure such as lawn applications, or a particular type of applicator, such as professionals. EPA believes the requirements should include the many other types of potential exposure, including dietary exposure from pesticide residues on fruit and vegetables sold in grocery stores.

Conclusions

Pesticide labels provide no indication that the chemicals in pesticide products sold in supermarkets, garden supply stores, etc., have not been assessed for chronic health risks in accordance with FIFRA, as amended, and EPA standards. Environmental groups believe the public should be told about the uncertainties of pesticides' chronic health risks so they could make more intelligent decisions about pesticide use. However, the pesticide industry questions the usefulness of public disclosure and fears adverse effects on the industry. Because it may take EPA until the next century to complete its chronic health risk assessment of pesticides on the market, we believe that the federal government should assess the arguments for and against public disclosure and take a position on this issue.

We believe that EPA should make a stronger effort to prevent the pesticide manufacturers and distributors from disseminating misleading safety information. Manufacturers and distributors sometimes make safety claims in their advertising that could discourage users from following label use directions and precautionary statements. EPA considers such claims to be false and misleading, and therefore prohibited by FIFRA, as amended. However, our review indicated that EPA has taken limited action against unlawful safety claims, because of limited enforcement resources and the low priority EPA has assigned to unlawful safety claims.

Professional pesticide applicators also make claims in their brochures that could lead consumers to believe that the pesticides applied in and around their homes are safe when, in fact, their chronic health and environmental risks have not been assessed in accordance with current standards. The effect of these claims is uncertain. However, such claims may

persuade consumers to purchase a service they otherwise would not use, or discourage reasonable precautions to minimize exposure, such as avoiding recently treated areas. According to EPA officials, the Agency does not have control over professional applicators' claims. The FTC, under its own legislation, can act against unacceptable safety claims by distributors and professional applicators, but FTC believes that EPA is better able to handle such claims because of its expertise and specific legislative authority.

In discussing the safety of their pesticides, professional applicators frequently state that they are registered by EPA. EPA advised us that such statements are acceptable. We believe, however, that such statements could be misleading because, as explained in chapter 2, many pesticides were registered without an assessment of their chronic health effects, and must now be reassessed.

Another public information issue involves the fact that people can be exposed to nonagricultural pesticides without their knowledge. For example, individuals may not realize that parks, school cafeterias, retail stores, subway cars, and other public places are treated with pesticides. Providing notification of such pesticide use is a difficult and controversial issue. Legitimate reasons exist for public notification. The costs, however, could be substantial, depending on the specific provisions of a notification program. We believe it may be time for the federal government to address the notification issue because (1) local governments are concerned about it, but are finding that they do not always have the authority to act; and (2) some pesticide industry representatives have indicated more receptivity to a uniform notification requirement than to a variety of local requirements.

Recommendations

We recommend that, if the Administrator, EPA, does not have the resources to act against unacceptable safety claims by pesticide distributors, he so inform the Congress, so it can decide whether to authorize additional resources, or grant EPA relief from this enforcement responsibility.

We also recommend that the Administrator seek an arrangement between EPA and FTC for controlling unacceptable safety claims by professional pesticide applicators. If additional resources are needed, the Congress should be so informed.

**Matters for
Consideration by the
Congress**

Because it may be several decades before EPA assesses the chronic health risks of nonagricultural pesticides, the Congress may wish to consider whether pesticide labels should state that EPA has not assessed the pesticides' chronic health risks in accordance with current standards.

The Congress may also wish to consider whether the public should be notified when public places are treated with pesticides, and whether the federal government should have a role in ensuring that the public is notified.

Regulation of Professional Pesticide Applicators

FIFRA, as amended, authorizes EPA to restrict the use of certain pesticides to individuals who (1) have demonstrated competency in the use and handling of pesticides or (2) work under the direct supervision of an individual who has demonstrated competency. However, the overwhelming majority of nonagricultural pesticides are unrestricted, in the sense that they may be used by anybody.¹

Although there are no federal controls over the competency of professional applicators who use only unrestricted pesticides, information we obtained from individual states showed that at least 40 states have controls designed to ensure that these applicators perform competently. Generally, the state controls are similar to FIFRA's controls over restricted-use pesticide applicators, i.e., applicators must either demonstrate their competency or work under the direct supervision of someone who has demonstrated competency. In several states, the controls are more stringent. That is, each applicator must demonstrate competency; working under direct supervision is not an option.

State programs also differ in identifying to whom the controls apply. In 25 of the 40 states that told us they control professional applicators of unrestricted pesticides, the controls apply only to "for-hire" applicators, such as employees of pest control and lawn care companies. In the other 15 states, the controls also apply to "not-for-hire" applicators, such as maintenance personnel, who apply pesticides as part of their duties.

Professional Applicators Apply a Significant Amount of Nonagricultural Pesticides

EPA statistics indicate that professionals apply most of the insecticides, herbicides, and fungicides used for nonagricultural purposes. EPA estimated that in 1984, about 165 million pounds of insecticides, herbicides, and fungicides were applied at industrial, commercial, and governmental facilities, and that all but a small amount were applied professionally. EPA estimated that 65 million pounds were applied to homes and gardens, but it could not estimate the amount of home and garden pesticides applied professionally. However, a 1982 study sponsored by a pest control association found that about 30 percent of private households surveyed had used the services of pest control firms. Also, the lawn care industry estimated that it currently services 6 to 7 million residential lawns.

¹ Although we use the term "unrestricted" to describe such pesticides, they are not uncontrolled. They have been registered by EPA only for specific purposes, and users may be required to take precautions, such as wearing gloves, when applying them.

There are two types of professional applicators—those who provide pest control services on a for-hire basis (“for-hire” applicators), and those who apply pesticides only to their employers’ properties (“not-for-hire” applicators). Examples of for-hire applicators are owner-operators of small pest control firms and employees of large pest control and lawn care companies. An EPA study estimated that in 1981, there were about 85,000 for-hire applicators in the United States. Examples of not-for-hire applicators are apartment complex and office building maintenance personnel and golf course grounds keepers.

Federal Controls Over Professional Applicators

The 1972 FIFRA amendments made it unlawful to use a pesticide in a manner inconsistent with its label directions, which are intended to prevent unreasonable adverse effects. However, the Congress recognized that in some cases, all the directions and precautions needed to prevent unreasonable risks could not be included on a label. Accordingly, the 1972 amendments also authorized EPA to restrict the use of individual pesticides to (1) persons who are certified by EPA (or by states with delegated authority) as being competent in the use and handling of pesticides (certified applicators), or (2) persons who work under the direct supervision of a certified applicator. In addition, EPA regulations state that restricted pesticides may generally be sold only to certified applicators. FIFRA, as amended, and EPA implementing regulations both state that a supervisor need not be physically present to provide direct supervision. EPA believes that the closeness of supervision should vary, depending on individual circumstances. The level of supervision required may be specified on restricted-use pesticide labels.

The 1972 FIFRA amendments require EPA to decide which pesticides should be restricted. EPA has generally restricted those that can cause severe acute effects when used improperly. It has also begun to restrict pesticides because of chronic health risks and groundwater concerns, and because some expertise may be needed to apply a pesticide properly. Through June 30, 1984, EPA had restricted fewer than 2,000 of 50,000 registered pesticides.

The president of the Association of American Pesticide Control Officials (AAPCO) estimates that in most states, 85 to 95 percent of professional applicators use only unrestricted pesticides for nonagricultural purposes. He believes this is due to two factors: (1) most restricted-use pesticides are registered primarily for agricultural purposes, and (2) professional applicators are reluctant to use pesticides that EPA has

judged hazardous enough to warrant restriction, when unrestricted pesticides are usually available for nonagricultural purposes.

State Controls Over Professional Applicators of Unrestricted Pesticides Vary

Most states have some controls to ensure that professional pesticide applicators perform competently when applying unrestricted pesticides. However, the extensiveness and stringency of their controls vary.

Through AAPCO, we solicited information from the 50 states and the District of Columbia on their controls over professional applicators of unrestricted pesticides. State officials were asked to describe the controls in place as of April 1, 1985. Forty-three states and the District of Columbia responded with descriptions of state requirements for obtaining a license and definitions of direct supervision (table 4.1 summarizes the responses).²

Forty of the 44 responding states reported some controls to assure that professional applicators perform competently when applying unrestricted pesticides. All 40 states control for-hire applicators and 15 states extend their controls to not-for-hire applicators.

A typical state control program provides that professional applicators of unrestricted pesticides must either (1) demonstrate competency in the use and handling of pesticides and obtain a license, or (2) work under the direct supervision of an individual who has demonstrated competency and obtained a license. However, several state programs are more restrictive. Five states require all for-hire applicators to demonstrate their competency and become licensed. These states do not provide the option of direct supervision. Six additional states do not provide the option of direct supervision for certain types of pesticide use, such as fumigations and termiticide applications.

The definition of "direct supervision" varies among the states. Most states do not require a supervisor to be physically present when unlicensed for-hire applicators are working. However, five states always require a supervisor to be present and three other states require a supervisor to be present during certain types of applications.

The minimum requirement imposed by the states to determine a prospective licensee's competency is a written examination. However, 13 states require classroom training or experience in addition to an exam.

²In subsequent discussion, the term "states" will include the District of Columbia, as appropriate.

Also, six additional states require training or experience for certain types of pesticide applications.

Table 4.1: State Controls Over Professional Applicators of Unrestricted Pesticides

	Number of States	
	For-hire applicators	Not-for-hire applicators
Licensing provisions		
All must be licensed	5	1
Must be licensed in some cases ^a	6	4
Unlicensed applicators must perform under direct supervision	29 ^b	10 ^c
Sub-total	40	15
No licensing provision	4	29
Total responding states	44	44
Requirements to obtain a license		
Written exam and additional requirements ^d	13	2
Written exam in some cases additional requirements apply ^e	6	2
Written exam	21	10
Total	40	14
Definition of direct supervision		
Licensee must always be present	5	4
Licensee must sometimes be present ^f	3	1
Licensee need not be present	26	8
Total	34	13

^aFor example, fumigation, termiticide applications, and structural pest control

^bIn addition, five of the six states that in some cases require licensing require direct supervision in cases where licensing is not required.

^cIn addition, three of the four states that in some cases require licensing require direct supervision in cases where licensing is not required.

^dFor example, classroom training, experience or apprenticeship

^eFumigation, termiticide applications

Conclusions

It is important to minimize pesticide exposure because all pesticides pose some risk, and the degree of chronic health risks is uncertain. Exposure can be minimized by proper use, which includes using a pesticide that is effective against the target pest and applying the pesticide in an effective manner. When the public applies pesticides themselves, they can read and follow the label directions for proper use. However, when pesticides are applied professionally—and a large portion of nonagricultural pesticides are applied professionally—the public health and safety may depend on proper use by professional applicators. Accordingly, it is

reasonable to require professional applicators to meet some competency standard.

FIFRA does not require professional pesticide applicators to demonstrate their competency unless they use the relatively few pesticides that EPA has restricted due to their potentially severe acute effects. We believe that those states that have control programs for professional applicators of unrestricted pesticides are making an effort to assure they perform competently, although we did not evaluate the state programs. It would seem appropriate that EPA should encourage states that do not have such programs to institute them. In this regard, EPA, with its vast pesticide experience, should develop a model program to help all the states institute effective programs that can provide assurance to the public that the pesticide applicator they hire is competent.

Recommendation

We recommend that the Administrator, Environmental Protection Agency, (1) encourage states that do not have unrestricted pesticide applicator control programs to institute such programs and (2) develop a model pesticide applicator control program for voluntary use by the states.

GAO Chemical Sample Selection Methodology

To determine the extent of EPA's chronic toxicity data on nonagricultural pesticides, we selected for review 50 chemicals that are widely used for nonagricultural purposes. Our primary source for identifying such chemicals was a 1984 report on the National Urban Pesticide Applicators Survey (NUPAS). The survey, sponsored by EPA, attempted to determine the amounts of individual chemicals used nationally by several types of professional applicators for nonagricultural purposes. The report ranked the chemicals in descending order, based on quantity used.

The NUPAS data has some limitations. Although the report was published in 1984, the reported use statistics are from 1981. Also, the study's methodology allowed some agricultural pesticide usage data to be included in the results. However, an official in OPP's Exposure Assessment Branch told us that the NUPAS data is the best available on nonagricultural pesticide usage.

Through discussions with EPA, we attempted to eliminate from the NUPAS report, chemicals that were used in large quantities primarily for agricultural purposes. We also eliminated petroleum distillates because their usage was reported by groups of chemicals rather than individually. Because the NUPAS report includes only professional applicator usage, we also asked EPA officials to identify chemicals that homeowners use in large quantities.

From the adjusted NUPAS listing and the homeowner usage data provided by EPA, we selected a sample of 50 chemicals. They represent the chemicals used in the largest volumes by professional applicators and/or homeowners. For details, see appendix II.

Sample of 50 Chemicals Used in Nonagricultural Pesticide Products

Chemical	Type of pesticide ^a	NUPAS ranking	Top 10 homeowner chemical?
2,4-D ^b	H	none ^c	Yes
Chlordane	I	2	Yes
Sulfuryl Fluoride	I	6	
Diazinon	I	7	Yes
Chlorpyrifos (Dursban)	I	9	Yes
Betasan	H	11	
Heptachlor	I	13	
Atrazine	H	14	
Dacthal (DCPA)	H	16	
Carbaryl	I	17	Yes
Methoxychlor	I	18	Yes
Aldrin	I	20	
Malathion	I	21	Yes
Diuron	H	22	
Bromacil (Hyvar X)	H	23	
Sodium Metaborate	H	24	
Sodium Chlorate	H	25	
Dichlorvos (DDVP)	I	28	
Simazine	H	31	Yes
Bendiocarb	I	32	
Parathion	I	33	
Dimethylamine Dicamba	H	34	
Metolachlor	H	36	
Dicofol	I	37	
Prometon	H	38	
Alachlor	H	39	
Polyputene	R	40	
Trichlorfon	I	42	
Toxaphene	I	44	
Endothal, Dipotassium salt of	H	47	
Aspon	I	48	
Diquat Dibromide	H	49	
Benetol	H	50	
Piperonyl Butoxide	I	51	
Glyphosate	H	52	
Lindane	I	53	
Acephate	I	54	
Pentachlorophenol	F	55	
Copper sulfate Pentahydrate	F	56	

Appendix II
Sample of 50 Chemicals Used in
Nonagricultural Pesticide Products

Chemical	Type of pesticide*	NUPAS ranking	Top 10 homeowner chemical?
Phorate	I	57	
Boric acid	I	59	
Picloram	H	60	
Satrolin	I	61	
Ferric sulfate	H	62	
Baygon(propoxur)	I	63	
Tebuthiuron	H	64	
Chlorothalonil	F	65	
Benomyl	F	66	
Maneo	F	76	Yes
Captan	F	88	Yes

*I-insecticide, F-fungicide, H-herbicide, R-rodenticide

**Many high volume chemicals in the NUPAS listing contain 2,4-D. We combined them because EPA will combine their reregistration reviews.

Insecticide Chemicals Used in Selected Locations in Boston, Massachusetts

Facility/Location	Chemicals
State facilities - four office buildings and one mental health facility	Acephate, Boric Acid, Chlorpyrifos, Diazinon, Malathion, Methoxychlor, Piperonyl Butoxide, Pyrethrins, Resmethrin, Terpene
Transit system stations	Chlorpyrifos, Pyrethrins
Public housing projects	Acephate, Baygon, Bendiocarb, Boric Acid, Chlorpyrifos, Diazinon, Methoprene, Propetamphos
Various park areas cared for by the Boston Parks and Recreation Department	Carbaryl, Metasystox, Methoxychlor
Federal office building	Amidinohydrazone, Boric Acid, Chlorpyrifos, Diazinon
Private multi family building used for public housing	Chlorpyrifos, Pyrethrins
Restaurant	Chlorpyrifos
Discount department store	Chlorpyrifos
Hotel	Chlorpyrifos
Industrial workplace	Chlorpyrifos
Retail food store	Chlorpyrifos
Private office building	Chlorpyrifos, Pyrethrins
Airplanes	Bendiocarb
Sports arena (non-food areas)	Diazinon
Hospital	Amidinohydrazone, Bendiocarb, Boric Acid, Chlorpyrifos, Pyrethrins

Herbicide Chemicals Used in Selected Locations in and Around Boston, Massachusetts

Facility/Location	Chemicals
State facilities - four office buildings and one mental health facility	2,4-D, DCPA, Dicamba, MCPP
State highway rights-of-way	2,4-D, 2,4-DP, Aminotrazole, Dalapon, Diuron, Fenac, Fosamine Ammonium, Tebuthiuron
Three utilities rights-of-way	2,4-D, Ammonium Sulfamate, Dicamba, Fosamine Ammonium, Glyphosate, Picloram, Triclopyr
Railroad rights-of-way	2,4-D, Ametryn, Atrazine, Dicamba, Diquat, Diuron, Glyphosate, Triclopyr
Unspecified rights-of-way	Metolachlor
Various parks areas cared for by the Boston Parks and Recreation Department	Glyphosate

Rodenticide Chemicals Used in Selected Locations in Boston, Massachusetts

Facility/Location	Chemicals
State facilities - four office buildings and one mental health facility	Brodifacoum, Bromadiolone
Transit system stations	Brodifacoum
Public housing projects	Brodifacoum, Bromadiolone, Rozol
Various park areas cared for by the Boston Parks and Recreation Department	Brodifacoum, Bromadiolone, Diphacinone
Boston neighborhood rodent control program - 108-block residential area	Brodifacoum, Bromadiolone, Diphacinone
Federal office building	Rozol, Diphacinone
Private multi-unit building used for public housing	Brodifacoum
Restaurant	Brodifacoum
Discount department store	Brodifacoum
Hotel	Brodifacoum
Retail food store	Brodifacoum
Private office building	Brodifacoum

Glossary

Active Ingredient (Chemical)	An ingredient in a pesticide product that destroys or controls a pest.
Acute Toxicity	The property of a substance or mixture of substances which causes adverse effects in an organism through a single exposure. The effect usually occurs shortly after the exposure.
Chronic Toxicity	The property of a substance or mixture of substances to cause adverse effects in an organism upon repeated or continuous exposure over a period of at least half the lifetime of that organism.
Disinfectant	A substance or mixture of substances intended to destroy infectious or other undesirable bacteria, pathogenic fungi, or viruses on surfaces or inanimate objects.
Formulation	The substance or mixture of substances comprised of all active and inert ingredients of a pesticide product.
Fungicide	A class of pesticides that prevents, destroys, or mitigates fungi (mushrooms, molds, mildews, rusts, etc.).
Herbicide	A class of pesticides that prevents, destroys, or mitigates unwanted plants or weeds.
Inert Ingredient	An ingredient in a pesticide product that does not destroy or control a pest, but rather is used to dissolve, dilute, propel, or stabilize the active ingredient in the pesticide product.
Insecticide	A class of pesticides that prevents, destroys, repels, or mitigates insects.
Metabolite	Any substance produced in or by biological processes and derived from a pesticide.

Mutagen	A substance or a mixture of substances that induces genetic changes in subsequent generations.
Oncogen	A substance or a mixture of substances that produces or induces tumor formations in living tissues.
Pest	Any harmful or unwanted insect, rodent, weed, or fungus, and any harmful virus or bacteria that is not on or in a person or animal.
Pesticide	A general term for chemical products used to destroy or control unwanted insects, fungi, mites, rodents, bacteria, or other organisms.
Rodenticide	A class of pesticides that prevents, destroys, repels, or mitigates rodents and closely related species.
Teratogen	A substance or mixture of substances that produces or induces birth defects.
